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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY-DOCKET NO.	CONFIRMATION NO.
09/535,303	03/24/2000	Yasuaki Namura	32430	2303

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EXAMINER

TRAN, KHANH C

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 10/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/535,303

Applicant(s)

NAMURA, YASUAKI

Examiner

Khanh Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-9 and 17-19 is/are allowed.
- 6) ☒ Claim(s) 1-6, 11-16 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

1. The Amendment A filed on 08/05/2003 has been entered. Claims 1-22 are pending in this Office action. New claims 21-22 are added.

Response to Arguments

2. Applicant's arguments, see pages 17-19 of the Amendment A, filed on 08/05/2003, with respect to the rejection(s) of claim(s) 1-3 and 11-13 under 35 U.S.C. 102(e), have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hornak et al. U.S. Patent 5,678,222.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6, 11-16 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hornak et al. U.S. Patent 5,678,222.

Regarding claims 1 and 11, Hornak invention is directed to a radio circuitry that uses a time-shared mixer and local oscillator to modulate, demodulate, and change the

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carrier frequency of an RF signal. Figure 12 illustrates an I-Q demodulator including a mixer 123, a local oscillator 127 providing an initial oscillator signal, a switching signal source 129 provides a switching signal, an alternating signal means 131 realized as a phase shifter 133 and a switching element 135, an I-Q switching element 203, and a pair of filter 205 and 207. The phase shifter shifts the phase of the initial oscillator signal by 90^0 to provide a phase-shifted oscillator signal. The switching element 135 is responsive to the switching signal to alternately couple the initial oscillator signal and the phase-shifted oscillator signal to the mixer 123 to produce in-phase baseband portion and the quadrature portion. The I-Q switching element 203, also under control of the switching signal, alternately couples the mixer output to the first low-pass filter 205 and to the second low-pass filter 207. Hornak teachings lack a second mixer for providing a quadrature portion as claimed in the instant application. Nevertheless, the I-Q demodulator as taught by Hornak still produces a quadrature reception baseband signal by utilizing a time-share mixer. The time-share mixer eliminates any need for precisely-matched mixers and amplifiers, therefore, is advantageous over a pair of quadrature mixers as claimed in the instant application. However, modification of Hornak teachings to incorporate a second mixer for a quadrature baseband signal output would have been obvious to one of ordinary skill in the art since it would not change the end results of Hornak invention.

Regarding claims 2 and 12, said claim is rejected using similar rejection argument of claim 1 since a modulator is a reverse process of a demodulator.

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Furthermore, figure 11 illustrates an embodiment of an I-Q modulator as taught by Hornak.

Regarding claims 3 and 13, said claim is rejected with the following arguments and in combination of the rejection argument of claim 1. Hornak teaches, in figure 11, an I-Q modulator that includes a time-share mixer circuit shown in figure 5A, and in figure 12, an I-Q demodulator that also includes a time-share mixer circuit shown in figure 5A. Hornak does not show a circuit that includes both I-Q modulator and I-Q demodulator. However, as well known in the art, almost all communication apparatus includes a transmitter and a receiver called transceiver. Hence, it would have been obvious for one of ordinary skill in the art to implement I-Q modulator and I-Q demodulator in figure 11 and figure 12 into a communication device for transmission and reception. Furthermore, Hornak further teaches that time-share mixer and the clock inverter eliminate any need for precisely matched mixers, amplifiers, and for precisely shifting the phase of the local oscillator signal. For the foregoing reasons, in the I-Q modulator and I-Q demodulator in figure 11 and figure 12, Hornak only implements one local oscillator, one switching signal source for providing a single switching signal to all the switches in the phase shifting means. Therefore, it would have been obvious for one of ordinary skill in the art that one would implement one local oscillator, one switching signal source, and one phase shifting means for the combined I-Q modulator and I-Q demodulator.

Regarding claims 4-5 and 14-15, in addition to the rejection argument of claim 1, figure 5B illustrates that the initial oscillator signal may be generated by phase-shifting

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the local oscillator output by a first phase shift $+45^{\circ}$, and the phase-shifted initial oscillator signal may be generated by phase-shifting the local oscillator output by a second phase shift -45° that is the inverse of the first phase shift. Obviously, the phase shift could be easily set at 90° and -90° as claimed in the application.

Regarding claims 6 and 16, said claims are rejected using similar rejection of claim 4. Furthermore, phase shift -45° obviously corresponds to delaying the phase of the local oscillator, and phase shift $+45^{\circ}$ obviously corresponds to advancing the phase of the local oscillator. The value $\pi/2$ is just a design choice.

Regarding claim 20, as well known in the art of computer technology, one could easily implement an executable program to execute a communication method as described in claim 11.

Regarding claims 21-22, said claim is rejected using similar argument of claim 1. Furthermore, Hornak further discloses in one embodiment that utilization of a clock inverter 159, as shown in figure 7, in place of a switching element, eliminates the need of precise phase control of the oscillator signal and the precision that is required of the switching element. The clocked inverter performs as a synchronous rectifier that provides a clocking signal of the same phase and frequency as the input signal, which is the local oscillation signal, resulting in an output that is a succession of half-cycles all of the same polarity.

Claim Objections

4. Claims 4-6 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims 4-6 refer to "*the first quadrature mixers and the second quadrature mixers*", which only applies to claim 3. Therefore, the claims have not been further treated on the merits.

5. Claim 10 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim 10 refers to "*the quadrature modulating means or said local oscillation signal producing means*", which does not apply to claim 7; and "*said local oscillation signal producing means*" does not apply to claim 8. Therefore, the claims have not been further treated on the merits.

6. Claim 6 is objected to because of the following informalities: in line 2, "as" has been changed to -- as --. Appropriate correction is required.

7. Claim 7 is objected to because of the following informalities: in line 13, " of" has been changed to -- of --. Appropriate correction is required.

8. Claim 8 is objected to because of the following informalities: in line 13, "based," has been changed to -- based --; in line 29, "the" has been changed to -- the --. Appropriate correction is required.

9. Claim 9 is objected to because of the following informalities: in line 19, "the'," has been changed to -- the --; in line 31, "Mean" has been changed to -- mean --; in line 33, "predetermined.'" has been changed to -- predetermined --; in line 36, "addressing '" has been changed to -- addressing --. Appropriate correction is required.

10. Claim 10 is objected to because of the following informalities: in line 5, ",'" has been changed to --; --. Appropriate correction is required.

11. Claim 14 is objected to because of the following informalities: in line 6, "signal." has been changed to --signal --. Appropriate correction is required.

12. Claim 16 is objected to because of the following informalities: in line 6, "and'" has been changed to -- and --. Appropriate correction is required.

13. Claim 21 is objected to because of the following informalities: in line 18, "mixiers" has been changed to -- mixers --. Appropriate correction is required.

Drawings

14. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, all features of

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claim 9 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Allowable Subject Matter

15. Claims 7-8 and 17-18 are allowed over prior art.

Regarding claims 7-8 and 17-18, said claims are directed to a multi-band data communication apparatus / method comprising uniquely distinct features "storage means for saving thereinto discrete data of a frequency pattern component functioning as a base" and "address generating means for generating an address every pre-selected clock" and "first analog converting means for analog converting data which is read out by addressing said storage means based on the address outputted from said address generating means..." and "second analog converting means for analog converting data which is read out by addressing said storage means based on the output of said phase shift means...". The closest prior art, Hornak et al. (US Patent 5,678,222) disclosing a similar apparatus utilizing a time-share mixer circuit, either singular or in combination, fail to anticipate or render the above underlined limitations obvious.

16. Claims 9 and 19 are allowed over prior art.

Regarding claims 9 and 19, said claims are directed to a multi-band data communication apparatus comprising uniquely distinct features "said local oscillation signal producing means includes storage means for saving therein discrete data of a frequency pattern component functioning as a base" and "address generating means for generating an address every pre-selected clock" and "first analog converting means for analog converting data which is read out by addressing said storage means based on the address outputted from said address generating means..." and "second analog converting means for analog converting data which is read out by addressing said storage means based on the output of said phase shift means...". The closest prior art, Hornak et al. (US Patent 5,678,222) disclosing a similar apparatus utilizing a time-share mixer circuit, either singular or in combination, fail to anticipate or render the above underlined limitations obvious.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 703-305-2384. The examiner can normally be reached on Tuesday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 703-306-3034. The fax phone

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number for the organization where this application or proceeding is assigned is (703)
872-9306.

Any inquiry of a general nature or relating to the status of this application or
proceeding should be directed to the receptionist whose telephone number is 703-305-
3800.

KCT


MOHAMMAD H. GHAYOUR
PRIMARY EXAMINER